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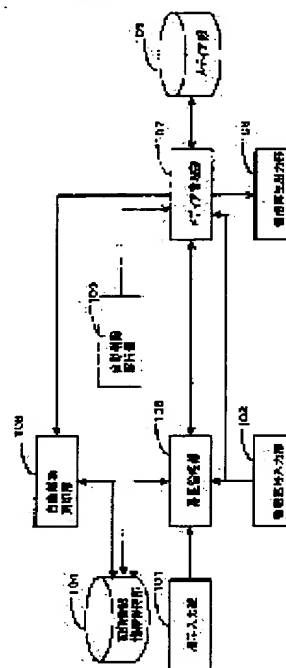
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(54) TERMINAL FOR RECORDING AND MANAGING NORMAL PROGRAM

(57)Abstract:

PROBLEM TO BE SOLVED: To allow a viewer to enjoy a desired broadcast program, without designating a recorded program in advance while utilizing effectively a large capacity of recording medium.

SOLUTION: A viewer enters the operation of a recorded program by using an instruction input section 101, a broadcast delivery side enters a program content and a program list by using a program signal entry section 102, a program management section 103 manages a relation between the recorded program and a recorded medium position, a recording program information storage section 105 uses a large capacity of medium to record the program, a program reproduction output section 106 displays the reproduced program for the viewer, a medium management section 107 manages the utilizing state of media, an automatic deleted marking section 108 gives a mark to an automatic deleted object of recorded programs, and an automatic delete execution section 109 deletes programs which are automatic deleted objects.



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[0024]

Hereunder, a terminal for recording and managing normal program will be explained with reference to the drawings.

[0025] First embodiment

FIG. 1 to FIG. 7 are views showing the terminal for recording and managing normal program of a first embodiment.

[0026]

First, the structure of the terminal for recording and managing normal program of the first embodiment will be explained with reference to FIG. 1. Designation mark 101 indicates an instruction entry section, and the instruction entry section 101 inputs instructions such as "program delete instruction" whereby a viewer gives an instruction to manually delete a program already recorded, and "program reproduction instruction" to reproduce the program already recorded by a remote controller, a key pad, and other input means.

[0027]

Designation mark 102 indicates a program signal entry section. The program signal entry section 102 inputs a program signal related to a broadcast supplied from a broadcast delivery side via ground waves, satellite, and a wired cable, and as the program signal, occasionally inputs a "program list" showing at least an individual broadcast program and a configuration

of an entire program.

[0028]

Designation mark 103 indicates a program management section. The program management section 103 calculates the time required for recording each program per each program based on the program list inputted from the program signal entry section 102, outputs "empty medium request" to a medium management section 107 for acquiring the empty medium for a recorded time thus calculated, inputs from the medium management section 107 "empty medium information" satisfying the "empty medium request", to thereby constitute "medium recording instruction" and outputs it to the medium management section 107 as a medium operation instruction.

[0029]

When "program reproduction instruction" is inputted from the instruction entry section 101, the program management section 107 inputs a desired "recording program information" to be reproduced from a recording program information holder 104, and extracts a "recording medium information" from the inputted "recording program information", to thereby constitute a "medium reproduction instruction" and outputs it to the medium management section 107 as a medium operation instruction.

[0030]

When the "program delete instruction" is inputted from the instruction entry section 101, the program management section

107 inputs the desired "recording program information" to be deleted from the recording program information holder 104, and extracts the "recording medium information" from the inputted "recording program information", to thereby constitute a "medium delete instruction" and outputs it to the medium management section 107 as a medium operation instruction.

[0031]

Designation mark 104 indicates a recording program information holder. The recording program information holder 104 replies to an inquiry whether or not the "recording program information" from the program management section 103 and an automatic delete execution section 108 is added, deleted, or already held.

[0032]

Designation mark 105 indicates a medium section. The medium section 105 is instructed to record, reproduce, and delete an image, sound, and data information for constituting a program signal and executes this instruction, wherein a digital medium such as large-capacity magnetic disk, optical disk, and digital video disk are used.

[0033]

Designation mark 106 indicates a program reproduction output section. When the "program reproduction instruction" is inputted from the instruction entry section 101, the program reproduction output section 106 inputs the image, sound, and

data information to be reproduced from the medium management section 107, and outputs them through a digital decoder and an output displayer or the like.

[0034]

Designation mark 107 indicates a medium management section. When the "medium recording instruction" is inputted from the program management section 103, the medium management section 107 inputs the program signal including a corresponding channel from the program signal entry section 102, and records it in the medium section 105.

[0035]

When the "medium reproduction instruction" is inputted from the program management section 103, the medium management section 107 inputs the image, sound, and data information from the medium section 105, following the medium information included in the "medium reproduction instruction", and outputs them to the program reproduction output section 106.

[0036]

In addition, when the "medium delete instruction" is inputted from the automatic delete execution section 109, the medium management section 107 deletes the image, sound, and data information held in the medium section 105, following the medium information included in the "medium delete instruction".

[0037]

In addition, when the "empty medium request" is inputted

from the program management section 103, the medium management section 107 discovers an area in the medium section 105 where the program is not recorded, and outputs it to the program management section 103 as "empty medium information".

[0038]

In addition, when a shortage of the empty area is generated in the medium section 105, the medium management section 107 outputs an "automatic deletion signal" to an automatic deletion marking section 108.

[0039]

Designation mark 108 indicates an automatic deletion marking section. The automatic deletion marking section 108 inputs the "automatic deletion signal" from the medium management section 107, and gives a deletion mark to a program as a deleted object that automatically deletes one or more recording program information out of the recording program information held in the recording program information holder 104, in the order from the one having the oldest recording time.

[0040]

Designation mark 109 indicates an automatic delete execution section. When there is the recording program information that is given a deletion mark in the recording program information stored in the recording program information holder 104, the automatic delete execution section 109 deletes the recorded program.

[0041]

Here, the program signal entry section 102 inputs a program list having a structure shown in a conceptual view of FIG. 2, and the recording program information holder 104 holds the recording program information having the structure shown in the conceptual view of FIG. 3.

[0042]

In FIG. 2, the item shown by <program ID> includes a program identifier such as a program title of the corresponding program; the item shown by <program sub-ID> includes attached information attached to the program identifier such as a program title of the corresponding program, for example, the above item includes a sub-title and a round of broadcast; the item shown by <channel> includes a broadcast channel identifier by which the corresponding program is broadcast; the item shown by <start time> includes date and time for starting the broadcast of the corresponding program; and the item shown by <period> includes the time from starting the broadcast of the corresponding program until it is ended. For example, a program list 201 shows the program whose program title is P1, subject this time is S1, which is broadcast by channel C1, started at 13:00 on March 1, 1997 and ended in 60 minutes.

[0043]

In FIG. 3, the item shown by <program ID> is the same as that of FIG. 2, and the item shown by <program sub-ID> is the

same as that of FIG. 2, the item shown by <channel D> is the same as that of FIG. 2, the item shown by <start time> is the same as that of FIG. 2, the item shown by <period> is the same as that of FIG. 2, the item shown by <recording medium information> includes positional information of the medium in which the corresponding program is recorded, for example, the above item includes the information such as a block and a sector, and the item shown by <deletion mark> includes the information "○" when the corresponding program is an object to be deleted, and includes the information "x" when the corresponding program is not the object to be deleted. For example, program information 301 showing the program, whose title is P3, subject this time is S3, and which is broadcast by channel 3, started at 9:00 on February 21, 1997 and ended in 120 minutes, is stored in a position L3 on the medium, thereby showing that it is not an object to be deleted. The terminal for recording and managing normal program thus constituted according to the first embodiment will be explained hereunder, step by step by using a flowchart of FIG. 4.

[0044]

(Step 401): In the program management section 103, when the program signal entry section 102 inputs the "program list" of FIG. 2, the processing proceeds to (step 402), however when the "program list" is not inputted, the processing is returned to the start.

[0045]

(Step 402): The program management section 103 acquires a broadcast channel number and broadcast time for each program information included in the "program list" of FIG. 2, and the processing proceeds to (step 403).

[0046]

(Step 403): The program management section 103 transmits the "empty medium request" to the medium management section 107, to obtain a sufficient un-recorded empty medium in a broadcast time, and waits for the input of the "empty medium information" from the medium management section 107 as an answer therefore. Meanwhile, when the "empty medium request" is inputted from the program management section 103, the medium management section 107 tries to acquire the corresponding empty medium. When the corresponding empty medium can be acquired, the medium management section 107 replies to the program management section 103 the acquired "empty medium information" in which a medium position is stored. When it is not acquired, the program management section 107 outputs the "automatic deletion signal" to the automatic deletion marking section 108, to thereby enlarge a usable area of the medium part, and the processing proceeds to (Step 408).

[0047]

(Step 404): The program management section 103 confirms a broadcast start time of the program of the program information.

At the broadcast start time, the processing proceeds to (step 405). Otherwise, the program management section 103 waits until the broadcast start time.

[0048]

(Step 405): The program management section 103 constitutes a "medium recording instruction" composed of a program channel, program time, and recording medium information to be recorded at the broadcast start time, and sends it to the medium management section 107, and the processing proceeds to (step 406).

[0049]

(Step 406): The program management section 103 constitutes "recording program information" from the program information and the empty medium information to be recorded, and stores it in the recording program information holder 104, and the processing proceeds to (step 407).

[0050]

(Step 407): The medium management section 107 inputs the "medium recording instruction" from the program management section 103, and executes recording of the program channel to be recorded selected from the program signal to be inputted, at a position designated by the recording medium information of the medium section 105, until the end time of the program to be recorded, and then the processing is returned to the start.

[0051]

(Step 408): When the "automatic deletion signal" is

inputted from the medium management section 107, the automatic deletion marking section 108 selects one or more recording program information stored in the recording program information holder 104 in order from the one having the oldest recording time, then, gives a deletion mark thereto, and stores them in the recording program information holder 104 again, and the processing proceeds to (step 403).

[0052]

(Step 411): In the program management section 103, when the "program reproduction instruction" is inputted from the instruction entry section 101, the processing proceeds to (step 412), and when the "program reproduction instruction" is not inputted, the processing is returned to the start.

[0053]

(Step 412): When the "recording program information" of FIG. 3 corresponding to the "program reproduction instruction" inputted from the instruction entry section 101 is held in the recording program information holder 104, the program management section 103 constitutes the "medium reproduction instruction" from the "recording program information" and outputs it to the medium management section 107, and the processing proceeds to (step 413), and when the "recording program information" corresponding to the inputted "program reproduction instruction" is not held in the recording program information holder 104, the processing is returned to the start.

[0054]

(Step 413): The program management section 103 constitutes the "medium reproduction instruction" from the recording medium information to be reproduced which is included in the inputted "recording program information", and transmits it to the medium management section 107, and the processing proceeds to (step 414).

[0055]

(Step 414): The medium management section 107 inputs the "medium reproduction instruction" from the program management section 103, reproduces and outputs a position shown by the recording medium information of the medium section 105, and reproduces and displays the program designated by the viewer through the program reproduction output section 106, and the processing is returned to the start.

[0056]

(Step 421): In the program management section 103, when the "program delete instruction" is inputted from the instruction entry section 101, the processing proceeds to (step 422), and when it is not inputted, the processing is returned to the start.

[0057]

(Step 422) In the program management section 103, when the recording program information corresponding to the "program delete instruction" inputted from the instruction entry section 101 is held in the recording program information holder 104,

the processing proceeds to (step 423), and when the recording program information corresponding to the inputted "program delete instruction" is not held in the recording program information holder 104, the processing is returned to the start.

[0058]

(Step 423): The program management section 103 gives a deletion mark to the recording program information corresponding to deletion, and stores it again in the recording program information holder 104, and the processing is returned to the start.

[0059]

(Step 431): In the automatic delete execution section 109, when there is deletion marked information out of the recording program information stored in the recording program information holder 104, the processing proceeds to (step 432), and when there is no deletion marked information, the processing is returned to the start.

[0060]

(Step 432): The automatic delete execution section 109 constitutes the "medium delete instruction" from the deletion marked recording program information, then outputs it to the medium management section 107, and the processing proceeds to (step 433). (Step 433): The medium management section 107 cancels the image, sound, and data information stored in the medium section 105, following the "medium delete instruction"

inputted from the automatic delete execution section 109, thereby enabling to reuse them, and the processing proceeds to (Step 434).

[0061]

(Step 434): The automatic delete execution section 108 deletes the recording program information that is already deleted under the "medium delete instruction", from the recording program information holder 104, and the processing is returned to the start.

[0062]

A part of a specific operation example of the terminal for recording and managing normal program according to the first embodiment that performs as described above will be explained by using FIG. 5, FIG. 6, and FIG. 7. Note that the program signal entry section 102 inputs the program list shown by FIG. 2 and image, sound data signal of program contents expressed by the program list shown by FIG. 2, and the recording program information holder 104 holds the recording program information shown in FIG. 3.

[0063]

(Operation 1-1): The program signal entry section 102 inputs the program list shown by FIG. 2 and the image, sound, data signal from a broadcast delivery side via ground waves, satellite, and a wired cable.

[0064]

(Operation 1-2): The program management section 103 extracts a program list 201 from the "program list" shown by FIG. 2 inputted by the program signal entry section 102, and outputs the "empty medium request" requesting to acquire an unused medium area of "60 minutes" stored in the <period> of the program list 201 to the medium management section 107.

[0065]

(Operation 1-3): The medium management section 107 inputs the "empty medium request" thus outputted by the (operation 1-2), acquires an empty medium area "L1" of 60 minutes from the medium section 105, and replies to the program management section 103 to the effect that "L1" is acquired as the empty medium area of 60 minutes, defining it as the "empty medium information".

[0066]

(Operation 1-4): The program management section 103 inputs the "empty medium information" outputted by the (Operation 1-3), and waits for 03/01/97 13:00 stored in the item of a <start time> of the program list 201.

[0067]

(Operation 1-5): The program management section 103 constitutes a medium recording instruction 501 of FIG. 5 wherein information "C1" stored in the item of <channel> of the program list 201 is defined as the item of <channel>, and the empty medium information "L1" inputted by the (operation 1-4) is defined as the item of <recording medium information>, and outputs it to

the medium management section 107.

[0068]

(Operation 1-6): The program management section 103 generates the "recording program information" shown by 601 of FIG. 6, which stores all items stored in the program list 201, the empty medium information "L1" inputted by the (operation 1-4) as the item of the <recording medium information>, and "x" showing that the object is not intended to be deleted as the item of <deletion mark>, and adds and stores it to/in the recording program information holder 104.

[0069]

(Operation 1-7): The medium management section 107 inputs the medium recording instruction 501 outputted by the (operation 1-5), and records a "C1" channel stored in the item of the <channel> out of the image, sound, data signal inputted from the program signal entry section 102, in a medium position "L1" of the medium section 105 stored in the item of the <recording medium information>, for "60 minutes" which is the information stored in the item of the <period>.

[0070]

(Operation 1-8): The program management section 103 extracts a program list 202 from the program lists shown by FIG. 2 inputted by the program signal entry section 102, and outputs the "empty medium request" requesting to the medium management section 107 the acquisition of the unused empty medium area of

"180 minutes" stored in the item of the <period> of the program list 202 to the medium management section 107.

[0071]

(Operation 1-9): The medium management section 107 inputs the "empty medium request" outputted by the "operation 1-2" and outputs the "automatic deletion signal" for expanding a usable area of the medium section to the automatic deletion marking section 108, because acquisition of the empty medium area of 180 minutes from the medium section 105 fails due to area shortage.

[0072]

(Operation 1-10): The automatic deletion marking section 108 inputs the "automatic deletion signal" outputted by the (operation 1-9), and selects the recording program information having the oldest recording end time, out of the "recording program information" of FIG. 3 and FIG. 6 stored in the recording program information holder 104. In FIG. 3 and FIG. 6, recording program information 301 and recording program information 303 have the oldest recording end time. Therefore, "○" showing that an object is intended to be deleted is stored in the item of the <deletion mark> stored in the recording program information, and the item of the <deletion mark> including "○" is stored again in the recording program information holder 104. At this point of time, the "recording program information" shown in FIG. 7 is stored in the recording program information holder 104.

[0073]

(Operation 1-11): The automatic delete execution section 109 extracts recording program information 701 and 703 stored in the recording program information holder 104 and then deletion marked, and outputs the "medium delete instruction" instructing to delete the media of "L3" and "L5" stored in the item of the <recording medium information> to the medium management section 107.

[0074]

(Operation 1-12): The medium management section 107 inputs the "medium delete instruction" outputted by the (operation 1-11), and the information stored in the position of the "L3" and "L5" are canceled, thereby enabling to reuse it.

[0075]

(Operation 1-13): The automatic delete execution section 108 deletes the recording program information 701 and the recording program information 703 stored in the recording program information holder 104, which are objects to be deleted.

[0076]

(Operation 1-14): The medium management section 107 replies to the program management section 103 to the effect that the "L3" and "L5" are acquired as the empty medium areas of 180 minutes, because the medium areas "L3" and "L5" of 180 minutes can be acquired by completion of the (operation 1-13).

[0077]

(Operation 1-15): The program management section 103 inputs the "empty medium information" outputted by the (operation 1-14), and waits for 03/01/97 14:00 stored in the item of the <start time> of the program list 202.

[0078]

(Operation 1-16): The program management section 103 constitutes a medium recording instruction 502 of FIG. 5, wherein the information "C1" stored in the item of the <channel> of the program list 202 is defined as the item of the <channel>, the information "180 minutes" stored in the item of the <period> is defined as the item of the <period>, and the empty medium information "L3" and "L5" inputted by the (operation 1-13) is defined as the item of the <recording medium information>, and outputs it to the medium management section 107.

[0079]

(Operation 1-17): The program management section 103 generates the recording program information shown by 602 of FIG. 6, which stores all items stored in the program list 202, and the empty medium information "L3 and L5" inputted by the (operation 1-15) as the item of the <recording medium information>, and the "x" showing that the object is not intended to be deleted as the <deletion mark>, and stores it in the recording program information holder 104.

[0080]

(Operation 1-18): The medium management section 107

records desired image, sound, and data signal in the medium section 105, following the medium recording instruction 502 outputted by the (operation 1-17). As described above, according to the first embodiment of the present invention, even at the time point where the recording medium area is deficient while continuing recordings of the program on a steady bases, the recordings of the program on a steady bases is continuously enabled by providing a mechanism capable of automatically deleting an already recorded program with old recording time which is already recorded and seems to be rarely reproduced, thereby saving time and labor in managing and maintaining recordings by a viewer.

[0081] Second embodiment

FIG. 8 is a block diagram of the terminal for recording and managing normal program in a second embodiment of the present invention. In FIG. 8, designation marks 801, 802, 805, 806, 807, and 809 indicate the same sections as those of the first embodiment, and the designation mark 803 indicates an expanded program management section. The expanded program management section 803 calculates for each program the time required for recordings based on the program list inputted from the program signal entry section 802, and in order to acquire the empty medium of the time thus calculated, outputs the "empty medium request" to the medium management section 807, and inputs from the medium management section 807 the "empty medium information" satisfying

the empty medium request, and also constitutes the "medium recording instruction" and outputs it to the medium management section 807 as the medium operation instruction.

[0082]

In addition, when the "program reproduction instruction" is inputted from the instruction entry section 801, the expanded program management section 803 inputs desired "recording program information" to be reproduced from an expanded recording program information holder 804, gives a reproduction mark to the inputted expanded recording program information showing it is already reproduced, stores it again in the expanded recording program information holder 804, and constitutes the "medium reproduction instruction" as the medium operation instruction, and outputs it. Further, when the "program delete instruction" is inputted from the instruction entry section 801, the expanded program management section 803 inputs the desired "recording program information" to be deleted from the expanded recording program information holder 804 and deletes it, extracts the recording medium information from the inputted expanded recording program information, and constitutes the "medium delete instruction" as the medium operation instruction, and outputs it.

[0083]

Designation mark 804 indicates the expanded recording program information holder, and the expanded recording program information holder 804 replies to an inquiry from the expanded

program management section 803 and the expanded automatic delete execution section 808, whether or not the expanded recording program information is added or deleted, or whether or not it is already held, and executes recording so that the expanded recording program information is already reproduced by the viewer.

[0084]

Designation mark 808 indicates an expanded automatic deletion marking section, and the expanded automatic deletion marking section 808 inputs the "automatic deletion signal" from the medium management section 807, and gives a deletion mark to one or more recording program information out of the recording program information held in the recording program information holder 804 as an automatically deleted object, in the order from the one having the oldest recording time and not reproduced by the viewer.

[0085]

Here, the expanded recording program information holder 804 holds the expanded recording program information having the structure shown in the conceptual view of FIG. 9. In FIG. 9, the item shown by <program ID>, the item shown by <program sub-ID>, the item shown by <channel>, the item shown by <start time>, and the item shown by <period> include the same information as the information in the first embodiment. In addition, the item shown by <reproduction mark> includes information "○" when the

program has ever been reproduced by the viewer, and includes "x" when the program has never been reproduced by the viewer. For example, according to designation mark 901, the program with a program title P3, a subject S3 this time, broadcast channel C3, started at 9:00 on February 21, 1997 and ended in 120 minutes, is stored in L3 position on a medium, and "x" indicates that this program is not an object to be deleted, and "O" indicates that this program is reproduced by the viewer.

[0086]

The terminal for recording and managing normal program according to the second embodiment thus constituted will be explained step by step, by using the flowchart of FIG. 10 and the flowchart of FIG. 4. Note that in the start (step 401), (step 402), (step 404) to (step 407), (step 411) to (step 414), (step 421) to (step 423), and (step 431) to (step 434), the recording program information can be replaced with the expanded recording program information in the first embodiment, the recording program information holder can be replaced with the expanded program information holder, and the program management section can be replaced with the expanded program management section, and the (step 404) proceeds to the (step 1001) instead of the (step 408), and the (step 414) proceeds to the (step 1002), and on this assumption, an explanation will be given hereunder.

[0087]

(Step 1001): When the "automatic deletion signal" is

inputted from the medium management section 807, the expanded automatic deletion marking section 808 selects one or more recording program information stored in the expanded recording program information holder 804 in the order from the one having the oldest recording time and never reproduced by the viewer, then, gives a deletion mark thereto, and stores it in the expanded recording program information holder 804 again, and the processing proceeds to (step 403).

[0088]

(Step 1002): The expanded program management section 803 gives a mark of reproduction showing that the program is already reproduced, to the expanded recording program information to be reproduced which is inputted in the (step 413), and stores it in the expanded recording program information holder 804 again, and the processing is returned to the start.

[0089]

A part of a specific operation example of the terminal for recording and managing normal program of the second embodiment that operates as described above, will be explained by using FIG. 11, FIG. 12, and FIG. 13. Note that the program signal entry section 802 inputs the program list shown in FIG. 2 and an image sound data signal of program contents shown in the program list of FIG. 2, and the expanded recording program information holder 804 holds the expanded recording program information shown in FIG. 9.

[0090]

In addition, FIG. 13 shows the conceptual view of the program reproduction instruction, and the item of the <program ID> shows the title of the program to be reproduced, and the item of the <program sub-ID> shows the sub-title of the program to be reproduced. For example, according to program reproduction instruction 1901, the instruction is given, such that the program with title of "P7" and sub-title of "P13" is reproduced.

[0091]

(Operation 2-1): The expanded program management section 803 extracts the program list 202 from the program list shown in FIG. 2 inputted by the program signal entry section 802, and outputs the empty medium request for requesting to acquire the unused empty medium area of "180 minutes" stored in the item of the <period> of the program list 202 to the medium management section 807.

[0092]

(Operation 2-2): The medium management section 807 inputs the "empty medium request" outputted by the "operation 2-1" and outputs the "automatic deletion signal" for expanding a usable area of the medium section 805 to the expanded automatic deletion marking section 808, because acquisition of the empty medium area of 180 minutes from the medium section 805 fails due to area shortage.

[0093]

(Operation 2-3): The expanded automatic deletion marking section 808 inputs the "automatic deletion signal" outputted by the (operation 2-2), and selects the recording program information having the oldest recording end time and which has never been reproduced, out of the expanded recording program information of FIG. 9 stored in the expanded recording program information holder 804. In FIG. 9, the expanded recording program information 902 and the expanded recording program information 903 correspond thereto. Therefore, "○" showing that the program is intended to be deleted, is included in the item of the <deletion mark> stored in the expanded recording program information, and the item of the <deletion mark> including "○" is stored again in the expanded recording program information holder 804.

[0094]

(Operation 2-4): The expanded automatic delete execution section 809 extracts the expanded recording program information 902 and 903 stored in the expanded recording program information holder 804 and deletion marked, and outputs the "medium delete instruction" instructing to delete the medium of "L4" and "L5" stored in the item of the <recording medium information> to the medium management section 807.

[0095]

(Operation 2-5): The medium management section 807 inputs

the "medium delete instruction" outputted by the (operation 2-4), and cancels the information stored in the positions of "L4" and "L5" on the medium section 805, thereby enabling to reuse it.

[0096]

(Operation 2-6): The medium management section 807 replies to the expanded program management section 803 to the effect that the "L4, L5" are acquired as the empty medium areas of 180 minutes as the "empty medium information", because the empty medium areas of 180 minutes "L4, L5" can be acquired by the completion of the (operation 2-5).

[0097]

(Operation 2-7): The expanded program management section 808 inputs the "empty medium information" outputted by the (operation 2-6), and waits for 03/01/97 14:00 stored in the item of the <start time> of the program list 202.

[0098]

(Operation 2-8): The expanded program management section 803 constitutes a medium recording instruction 1101 of FIG. 11 wherein information "C1" stored in the item of the <channel> of the program list 202 is defined as the item of the <channel>, the information stored in the item of the <180 minutes> is defined as the item of the <period>, and the empty medium information "L4" and "L4, 15" inputted by the (operation 2-7) is defined as the item of the <recording medium information>, and outputs it to the medium management section 807.

[0099]

(Operation 2-9): The expanded program management section 803 generates the "expanded recording program information" shown by 1201 of FIG. 12 which stores all items stored in the program list 202, the empty medium information "L4, L5" inputted by the (operation 2-7) as the item of the <recording medium information>, "x" showing that the object is not intended to be deleted as the item of the <deletion mark>, and "x" showing that the medium has never been reproduced as the <reproduction mark>, and stores it additionally in the expanded recording program information holder 804.

[0100]

(Operation 2-10): Following the medium recording instruction 110 outputted by the (operation 2-8), the medium management section 807 records the desired image, sound, and data signal in the medium section 805.

[0101]

(Operation 2-11): The instruction entry section 801 inputs a program reproduction instruction 1301 shown in FIG. 13 by the user by using a remote controller or the like.

[0102]

(Operation 2-12): The expanded program management section 803 confirms with the expanded recording program information holder 804 that the expanded recording program information 905 of FIG. 9 corresponding to the program reproduction instruction

1301 is held in the expanded recording program information holder 804, and outputs the medium reproduction instruction for performing reproduction from the medium position "L7" stored in the item of the <recording medium information> of the expanded recording program information 905 to the medium management section 807.

[0103]

(Operation 2-13): The medium management section 807 inputs the "medium reproduction instruction" outputted by the (operation 2-12), starts to reproduce from the position of "L7" of the medium section 805, and outputs the image, sound, data information to the program reproduction output section 806.

[0104]

(Operation 2-14): The expanded program management section 803 rewrites the information stored in the item of the <reproduction mark> of the expanded recording program information 905 with "○" showing that the information is already reproduced, and stores it again in the expanded recording program information holder 804. By this operation, the expanded recording program information to be automatically deleted next time becomes the expanded recording program information 904 of FIG. 9. As described above, according to the second embodiment of the present invention, the program reproduced by the viewer is saved in the already recorded programs. Therefore, only an old program which is already recorded and has never been

reproduced can be selectively deleted, and an interesting program for the viewer can be selectively automatically saved. In addition, the terminal for recording and managing normal program capable of effectively using the large capacity recording medium the viewer is not troubled to prevent the program from being deleted, the program being reproduced once and intended to be saved for a long period of time or intended to be reproduced again in future, and can be provided.

[0105]

Note that according to the second embodiment of the present invention, the program reproduced by the viewer out of the already recorded programs is saved. Therefore, only an old program which is already recorded and has never been reproduced is selectively deleted. However, there is no problem in saving the program when prescribed number of times or more of reproduction is performed, or deleting the program when prescribed number of times or less of reproduction is performed.

[0106] Third embodiment

FIG. 14 is a block diagram of the terminal for recording and managing normal program of a third embodiment. In FIG. 14, designation marks 1401 to 1407, and 1409 indicate the same sections as those of the embodiment 2. Designation mark 1408 indicates an associative automatic deletion marking section, and inputs the "automatic deletion signal" from the medium management section 1407, and gives a deletion mark to one or

more recording program information not having the same program name as that of the program having the oldest recording time and having never been reproduced by the viewer, out of the expanded recording program information held in the expanded recording program information holder 1404, as the program to be automatically deleted.

[0107]

Here, the expanded recording program information holder 1404 holds the expanded recording program information having the structure shown in the conceptual view of FIG. 9. Note that FIG. 9 shows the same view used in the second embodiment.

[0108]

The terminal for recording and managing normal program of the third embodiment having the above-described structure will be explained step by step by using the flowchart of FIG. 15, the flowchart of FIG. 10, and the flowchart of FIG. 4. Note that starts, (step 401), (step 402), (step 404) to (step 407), (step 411) to (step 414), (step 421) to (step 423), (step 431) to (step 434), and (step 1002) indicate the same steps as those of the second embodiment, and the (step 404) proceeds to (step 1501) instead of the (step 1001), and based on this assumption, the explanation will be given hereunder.

[0109]

(Step 1501): When the "automatic deletion signal" is inputted, the associative automatic deletion marking section

1408 selects one or more of recording program information out of the expanded recording program information stored in the expanded recording program information holder 1404, having the oldest recording time and having never been reproduced by the viewer and not having the same title as the tile of the program reproduced in the past, gives a deletion mark thereto, and stores it again in the expanded recording program information holder 1404, and the processing proceeds to (step 403).

[0110]

A part of a specific operation example of the terminal for recording and managing normal program of the third embodiment that operates as described above will be explained by using FIG. 11 and FIG. 12.

[0111]

A program signal entry section 1402 inputs the program list shown in FIG. 2 and the image sound data signal of the program content expressed by the program list shown in FIG. 2, and the expanded recording program information holder 1404 holds the expanded recording program information shown in FIG. 16.

[0112]

(Operation 3-1): The (operation 3-1) is the same as the (operation 2-1).

[0113]

(Operation 3-2): The (operation 3-1) is the same as the (operation 2-1).

[0114]

(Operation 3-3) The associative automatic deletion marking section 1408 inputs the "automatic deletion signal" outputted by the (operation 3-2), and selects the recording program information out of the expanded recording program information of FIG. 16 stored in the expanded recording program information holder 1404, having the oldest recording end time and having never been reproduced and not having the same program ID as the program ID of the program reproduced in the past. In FIG. 16, the expanded recording program information 1602 and the expanded recording program information 1604 correspond thereto, and therefore "○" showing a deleted object is stored in the item of the <deletion mark> stored in the expanded recording program information, and the item of the <deletion mark> including "○" is stored again in the expanded recording program information holder 1404. Note that the expanded recording program information 1603 is not reproduction marked, or has the same program ID as that of the expanded recording program information 1601 and the expanded recording program information 1601 is not reproduction marked. Therefore, the expanded recording program information 1603 cannot be the object to be deleted.

[0115]

(Operation 3-4): An expanded automatic deletion executing section 1409 extracts expanded recording program information

1602 and 1604 stored in the expanded recording program information holder 1404 and deletion marked, and outputs the "medium delete instruction" for instructing the deletion of the media of the "L4" and "L6" stored in the item of the <recording medium information> to the medium management section 1407.

[0116]

(Operation 3-5): The medium management section 1407 inputs the "medium delete instruction" outputted by the (operation 3-4), and cancels the information stored in the positions of the "L4" and "L6", thereby enabling to reuse it.

[0117]

(Operation 3-6): The medium management section 1407 replies to the expanded program management section 1403 to the effect that "L4, L6" are acquired as the empty medium areas of 180 minutes, because the empty medium areas "L4, L6" of 180 minutes can be acquired by completion of the (operation 3-5).

[0118]

(Operation 3-7): The expanded program management section 1403 inputs the "empty medium information" outputted by the (operation 3-6) and waits for 03/01/97 14:00 stored in the item of the <start time> of the program list 202.

[0119]

(Operation 3-8): The expanded program management section 1403 constitutes the medium recording instruction, with the information "C1" stored in the item of the <channel> of the program

list 202 as the item of the <channel>, the information "180 minutes" stored in the item of the <period> as the item of the <period>, and empty medium information "L4L6" inputted by the (operation 2-7) as the item of the <recorded medium information>, and outputs it to the medium management section 1407.

[0120]

(Operation 3-9): The expanded program management section 1403 generates the expanded recording program information which stores all items stored in the program list 202, the empty medium information "L4 L6" inputted by the (operation 3-7) as the item of the <recording medium information>, "x" showing that the recorded information is not the object to be deleted, as the item of the <deletion mark>, and "x" showing that the recorded information has never been reproduced, as the item of the <reproduction mark>, respectively, and adds and stores it additionally in the expanded recording program information holder 1404.

[0121]

(Operation 3-10): Following the medium recording instruction outputted by the (operation 3-8), the medium management section 1407 records the desired image, sound, and data signal in the medium section 1405.

[0122]

As described above, according to the third embodiment of the present invention, even when the program has never been

reproduced, when the program having the same title is reproduced in the past, the deletion can be prevented. Therefore, the viewer can selectively perform automatic saving of the program having the same title, as an interesting program for the viewer, irrespective of broadcast time and date. In addition, it is easy to estimate that a continuous broadcast program every day or every week, which has not been reproduced, is possibly reproduced in future. Therefore, it is not necessary to expressly exclude such a program separately from the object to be automatically deleted, and therefore the mechanism of the terminal for recording and managing normal program capable of effectively using the large capacity recording medium can be provided.

[0123]

[Advantage of the invention]

As described above, according to the present invention, there is provided a terminal on the side of the viewer in the broadcast system wherein a plurality of program channels constituted of a plurality of broadcast programs are supplied and received, and one or more program channels can be recorded for 24 hours at all times. In the terminal for recording and managing normal program thus constituted in which the recording of the program continues all the times, by providing the mechanism capable of automatically deleting the program already recorded and having the old recording time which seems to have few chance

of being reproduced even when the area shortage of the recording medium occurs, the viewer is not troubled in maintaining and managing, so that the program can be continuously recorded all the times.

[0124]

In addition, the program reproduced by the user is saved out of the already recorded programs. Therefore, only an old program which is already recorded and has never been reproduced can be selectively deleted, and the interesting program for the viewer can be selectively and automatically saved.

[0125]

In addition, it is not necessary for the viewer to be troubled in preventing the program from deletion, which is intended to be reproduced once and saved for a long period of time or intended to be reproduced again in the future, thus realizing the mechanism of the terminal for recording and managing normal program capable of effectively using the large capacity recording medium.

[0126]

In addition, even when the program has never been reproduced, by reproducing the program having the same title in the past, the deletion can be prevented. Therefore, irrespective of the broadcast time and date, the program having the same title can be selectively and automatically saved as the interesting program for the viewer. Also, it is easy to

estimate that a continuous broadcast program every day or every week, which has not been reproduced, is possibly reproduced in the future. Therefore, it is not necessary to expressly exclude such a program separately from the object to be automatically deleted, and therefore the mechanism of the terminal for recording and managing normal program capable of effectively using the large capacity recording medium can be provided.

[0127]

Accordingly, the viewer can enjoy the desired program without designating a recorded program in advance, while effectively utilizing a large capacity of the recording medium. Therefore, the present invention exhibits a remarkable advantage.

FIG. 10

1 IS EMPTY MEDIUM ACQUIRED?
2 AUTOMATIC DELETION PROGRAM INFORMATION IS EXTRACTED BY
RECORDING TIME AND REPRODUCITON MARK, AND DELETION MARKED
3 REPRODUCITON MARK OF EXPANDED RECORDING PROGRAM
INFORMATION

FIG. 13

4 PROGRAM REPRODUCTION INSTRUCTION
5 PROGRAM ID
6 PROGRAM SUB-ID

FIG. 1

108 AUTOMATIC DELETION
MARKING SECTION
104 RECORDING PROGRAM INFORMATION HOLDER
109 AUTOMATIC DELETE EXECUTION SECTION
101 INSTRUCTION ENTRY SECTION
103 PROGRAM MANAGEMENT SECTION
107 MEDIUM MANAGEMENT SECTION
105 MEDIUM SECTION
102 PROGRAM SIGNAL ENTRY SECTION
106 PROGRAM REPRODUCTION OUTPUT SECTION

FIG. 2

1 PROGRAM LIST
2 PROGRAM ID
3 PROGRAM SUB-ID
4 CHANNEL
5 START TIME
6 PERIOD
7 60 MINUTES
8 180 MINUTES

FIG. 5

9 MEDIUM RECORDING INSTRUCTION
10 CHANNEL
11 PERIOD
12 RECORDING MEDIUM INFORMATION
13 60 MINUTES
14 180 MINUTES

FIG. 3

1 RECORDING PROGRAM INFORMATION
2 PROGRAM ID
3 PROGRAM SUB-ID
4 CHANNEL
5 START TIME
6 PERIOD
7 RECORDING MEDIUM INFORMATION

8 DELETION MARK
9 120 MINUTES
10 120 MINUTES
11 60 MINUTES
12 120 MINUTES
13 60 MINUTES

FIG. 6

14 RECORDING PROGRAM INFORMATION
15 PROGRAM ID
16 PROGRAM SUB-ID
17 CHANNEL
18 START TIME
19 PERIOD
20 RECORDING MEDIUM INFORMATION
21 DELETION MARK
22 60 MINUTES
23 180 MINUTES

FIG. 7

24 RECORDING PROGRAM INFORMATION
25 PROGRAM ID
26 PROGRAM SUB-ID
27 CHANNEL
28 START TIME

29 PERIOD,
30 RECORDING MEDIUM INFORMATION
31 DELETION MARK
32 120 MINUTES
33 120 MINUTES
34 60 MINUTES
35 120 MINUTES
36 60 MINUTES
37 60 MINUTES

FIG. 11

38 MEDIUM RECORDING INSTRUCTION
39 CHANNEL
40 PERIOD
41 RECORDING MEDIUM INFORMATION
42 180 MINUTES

FIG. 4

1 START
2 IS PROGRAM LIST INPUTTED?
3 PROGRAM INFORMATION IS EXTRACTED (FOR EACH PROGRAM
INFORMATION)
4 IS EMPTY MEDIUM ACQUIRED?
5 AUTOMATIC DELETE PROGRAM INFORMATION IS EXTRACTED AND
DELETION MARKED BY RECORDING TIME

6 IS IT BROADCAST START TIME?
7 MEDIUM RECORDING INSTRUCTION IS OUTPUTTED
8 RECORDING PROGRAM INFORMATION IS RECORDED
9 PROGRAM RECORDING IS EXECUTED
10 START
11 IS PROGRAM REPRODUCTION INSTRUCTION INPUTTED?
12 IS RECORDING PROGRAM INFORMATION HELD?
13 MEDIUM REPRODUCTION INSTRUCTION IS OUTPUTTED
14 PROGRAM REPRODUCTION IS EXECUTED
15 START
16 IS PROGRAM DELETE INSTRUCTION INPUTTED?
17 IS RECORDING PROGRAM INFORMATION HELD?
18 RECORDED PROGRAM INFORMATIO IS DELETION MARKED
19 START
20 IS TEHRE RECORDING PROGRAM INFORMATION DELETION MARKED?
21 MEDIUM DELETE INSTRUCTION IS OUTPUTTED
22 PROGRAM DELETION IS EXECUTED
23 RECORDING PROGRAM INFORMATION IS DELETED
24 START

FIG. 12

25 EXPANDED RECORDING PROGRAM INFORMATION
26 PROGRAM ID
27 PROGRAM SUB-ID
28 CHANNEL

29 START TIME
30 PERIOD
31 RECORDING MEDIUM INFORMATION
32 DELETION MARK
33 REPRODUCITON MARK
34 180 MINUTES

FIG. 8

808 EXPANDED AUTOMATIC DELETION MARKING SECTION
804 EXPANDED RECORDING PROGRAM INFORMATION HOLDER
809 AUTOMATIC DELETE EXECUTION SECTION
801 INSTRUCTION ENTRY SECTION
803 EXPANDED PROGRAM MANAGEMENT SECTION
807 MEDIUM MANAGEMENT SECTION
805 MEDIUM SECTION
802 PROGRAM SIGNAL ENTRY SECTION
806 PROGRAM REPRODUCTION OUTPUT SECTION

FIG. 9

1 EXPANDED RECORDING PROGRAM INFORMATION
2 PROGRAM ID
3 PROGRAM SUB-ID
4 CHANNEL
5 START TIME
6 PERIOD

7 RECORDING MEDIUM INFORMATION
8 DELETION MARK
9 REPRODUCITON MARK
10 120 MINUTES
11 120 MINUTES
12 60 MINUTES
13 120 MINUTES
14 60 MINUTES
15 60 MINUTES

FIG. 14

1408 ASSOCIATIVE AUTOMATIC DELETION MARKING SECTION
1404 EXPANDED RECORDING PROGRAM INFORMATION HOLDER
1409 AUTOMATIC DELETE EXECUTION SECTION
1401 INSTRUCTION ENTRY SECTION
1403 EXPANDED PROGRAM MANAGEMENT SECTION
1407 MEDIUM MANAGEMENT SECTION
1405 MEDIUM SECTION
1402 PROGRAM SIGNAL ENTRY SECTION
1406 PROGRAM REPRODUCTION OUTPUT SECTION

FIG. 16

1 EXPANDED RECORDING PROGRAM INFORMATION
2 PROGRAM ID
3 PROGRAM SUB-ID

4 CHANNEL
5 START TIME
6 PERIOD
7 RECORDING MEDIUM INFORMATION
8 DELETION MARK
9 REPRODUCITON MARK
10 120 MINUTES
11 120 MINUTES
12 60 MINUTES
13 120 MINUTES

FIG. 15

1 IS EMPTY MEDIUM ACQUIRED?
2 AUTOMATIC DELETED PROGRAM INFORMATION IS EXTRACTED AND
DELETION MARKED BY RECORDING TIME, REPRODUCITON MARK, AND PROGRAM
ASSOCIATION